Problem Statement 1:

You survey households in your area to find the average rent they are paying. Find the standard deviation from the following data:

$1550, $1700, $900, $850, $1000, $950.

Sol: Standard deviation formula:

$$S = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$$

Mean : $\frac{1550+1700+900+850+1000+950}{6} = 1158.33$

	Data (X)	Mean($\bar{x}$)	x-$\bar{x}$	$(x-\bar{x})2$
1	1550	1158.33	391.67	153405.3889
2	1700	1158.33	541.67	293406.3889
3	900	1158.33	-258.33	66734.3889
4	850	1158.33	-308.33	95067.3889
5	1000	1158.33	-158.33	25068.3889
6	950	1158.33	-208.33	43401.3889
Total:	6950			677083.3
	(mean) 1158.35			

$$S = \sqrt{\frac{677083.3}{5}} = \sqrt{135416.66} = 367.99$$

Problem Statement 2:

Find the variance for the following set of data representing trees in California (heights in

feet):

3, 21, 98, 203, 17, 9

Sol: variance s = $\sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}}$

	Data (X)	Mean($\bar{x}$)	x-$\bar{x}$	$(x-\bar{x})2$
1	3	58.5	- 55 .5	3080.25
2	21	58.5	-37.5	1406.25
3	98	58.5	39.5	1560.25
4	203	58.5	144.5	20880.25
5	17	58.5	-41.5	1722.25
6	9	58.5	- 49.5	2450.25
Total:	351		0	31099.5
	Mean: 58.5			

$$S = \sqrt{\frac{31099.5}{5}} = \sqrt{6219.9} = 78.86634$$

Problem Statement 3:

In a class on 100 students, 80 students passed in all subjects, 10 failed in one subject, 7 failed in two subjects and 3 failed in three subjects. Find the probability distribution of the variable for number of subjects a student from the given class has failed in.

Solution:

For a random student,

The probability of failing in 0 subjects, P(X=0) = 0.8

The probability of failing in 1 subjects, P(X=1) = 0.1

The probability of failing in 2 subjects, P(X=2) = 0.07

The probability of failing in 3 subjects, P(X=3) = 0.03

The probability distribution can be shown as:

X	0	1	2	3
P(X)	0.8	0.1	0.07	0.03